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ABSTRACT

As part of a plan to raise the educational achievement level of Hawaiian children, a pre-kindergarten educational program will be implemented to serve preschool-age children who have the greatest risk of academic failure. The selection of sites for the program is to be determined by a systematic assessment of needs which will (1) analyze demographic data and test results to identify high priority sites, (2) identify and assess education-related needs within these sites, and (3) identify specific needs of site clientele. This report presents the method by which priority sites were identified. Mean scores on the Peabody Picture Vocabulary Test-Revised and the Developmental Test of Visual-Motor Integration were combined with an indicator of socioeconomic status for each school and the number of Hawaiian children enrolled in kindergarten at each school to create indexes of need. Using these indexes, the elementary school attendance areas were rank-ordered by the largest number of Hawaiian children with the greatest educational need. The information gathered in this procedure is the first step in selecting sites for services. One of the most useful findings of the study was that the statewide need for educationally oriented services is highly concentrated--30 percent of the state's under-5-year-old Hawaiian population is found in the 15 identified schools needing highest priority. (PCB)

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WORKING PAPER

The Center for Development of Early Education

Kamehameha Schools/Bernice P. Bishop Estate

Honolulu, Hawaii

THE IDENTIFICATION OF PRIORITY SITES FOR PARENT-CHILD SERVICES

Robert W. Heath and Jerald Plett

September 1985

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The Identification of Priority Sites for Parent-Child Services

In 1980 Kamehameha Schools/Bishop Estate (KS/BE) initiated a comprehensive plan to raise the level of educational achievement of Hawaiian children throughout the State of Hawaii. "One of the measurable objectives is to assist Hawaiian children throughout the Islands achieve scores in reading and language that are at or above the national averages" (Kamehameha Schools/Bishop Estate, 1981, p. 3). As part of this plan, the Pre-Kindergarten Educational Program (PREP) is to serve those pre-school age Hawaiian children who have the greatest risk of academic failure.

PREP is developing educational programs in five preschools. It is also developing a program of service for both parents and children that is to include extensive support services for participating families, as well as education for parents in health, nutrition, child care and development, home management, and community resources. Future sites for program development are to be located in those neighborhoods of highest need. That is, the program is to serve families in those neighborhoods where the social indicators associated with poor educational outcomes are most extreme and where the school achievement of Hawaiian children is the lowest. The selection of sites and the configuration of services at each site is to be determined by a systematic assessment of needs.

This needs-assessment design has three stages.[1] The first stage employs available educational test results and demographic data. These data are analyzed from a statewide perspective to identify high priority sites, based on need, for parent child services. Subsequent stages are increasingly more intensive in focus. The second stage will be directed to the identification and assessment of

[1]This needs assessment is being conducted as part of the Kamehameha Schools/Bernice Pauahi Bishop Estate, Center for the Development of Early Education, Pre-Kindergarten Educational Program, Richard N. Roberts, Director.

education-related needs within the high-priority sites. The third stage will identify the specific needs of the priority-site clientele. The research reported here is one element of the first stage of this design.

Method

The objective of this part of the needs assessment was:

to identify and rank-order those elementary-school attendance areas with the largest number of Hawaiian children with the highest priority of educational need in the State.

To accomplish this objective, three need indexes were constructed for 164 elementary school-attendance areas[2], based on data obtained from the State of Hawaii Department of Education for kindergarten students who participated in the 1983-84 school year assessment program. These data included:

1. The Peabody Picture Vocabulary Test-Revised (PPVT-R) (Dunn & Dunn, 1981) mean scores for 1983-84 Hawaiian kindergarten children enrolled at each elementary school in the State. This test is thought to be sensitive to school-like parental teaching (e.g., reading to the child), the intellectuality of the home, and immersion in standard English usage. This test was administered near the beginning of the school year.
2. The Developmental Test of Visual-Motor Integration (VMI) (Beery, 1982) mean scores for 1983-84 Hawaiian kindergarten pupils at each elementary school in the State. This test is said to measure neuropsychological development, and in contrast to the PPVT-R, to be relatively independent of cultural and educational influences in the home. This test was also administered at the beginning of the school year.

[2]Seven schools were excluded from the analyses because of incomplete data. These schools were Kai'ulani, Palolo, Waikiki, Shafter, Barber's Point, Kunia, and Niihau.

3. An indicator of socio-economic status (SES) of each school. This indicator is defined as the proportion of all students enrolled at each elementary school whose families receive either AFDC or General Assistance.

4. The number of Hawaiian children enrolled in kindergarten classes at each elementary school during the 1983-84 school year. These numbers are based on the ethnic self-identification of the children's parents. There is reason to believe that these numbers underestimate the actual number of Hawaiian/part-Hawaiian children in attendance.

These four variables were combined to create indexes of need using the formula:

$$\text{Need} = \left[\left(\left[\frac{1}{\overline{\text{PPVT-R}}_T + \overline{\text{VMI}}_T \quad X} \right]_T + \left[\text{SES}_T \right]_T \right) \left(N_{\text{Hwn}} \right) \right]_T$$

where: $\overline{\text{PPVT-R}}_T$ = the mean PPVT-R score of a school expressed as a standard score (T) in a distribution of school mean PPVT-R scores.

$\overline{\text{VMI}}_T$ = the mean VMI score of a school expressed as a standard score (T) in a distribution of school mean VMI scores.

SES_T = the proportion of children attending a school whose families are recipients of AFDC and/or GA, expressed as a standard score (T) in a distribution of such proportions.

X = a weighting term to determine the relative contribution of the PPVT-R and VMI tests on the combined test-score term.

N_{Hwn} = the number of Hawaiian kindergarten students at each school.

Since judgements vary regarding the relative importance of the variables, alternative weighting schemes were used to see, if by placing different relative values on verbal, neuropschological, and socioeconomic indicators, different sites would be assigned priority status. Three different weighting schemes were used with the formula.

Need 1 = the weighting term (X) is set equal to one. This results in the PPVT-R and the VMI tests being equally weighted in a single test-score term, and this term being equally weighted with the SES indicator.

Need 2 = the weighting term (X) is set equal to zero, removing the VMI from the formula. This results in the PPVT-R mean score for each school being weighted equally with the SES indicator for that school.

Need 3 = the weighting term (X) is set equal to .5. This results in the PPVT-R mean score for each school being weighted <u>twice</u> as heavily as the VMI mean, and this combined test-score term being weighted equally with the SES indicator.

Using these three variations of the formula, the 164 elementary-school attendance areas were rank-ordered by the largest number of Hawaiian children with the greatest educational need. Based on these analyses, the 15 attendance areas of highest need priority were identified for more intensive needs assessment.

Results

The summary statistics for the variables used in the formula employed to define need are given in Table 1.

Table 1

Summary Statistics of Need-Identification Variables (N=164 Schools)

	Variable			
	$\overline{\text{PPVT-R}}_{\text{Hwn}}$*	$\overline{\text{VMI}}_{\text{Hwn}}$*	SES	N_{Hwn}
Mean raw score	42.9	7.6	12.9	16.6
National norm percentile equivalent of mean score	13.0	45.0	NA	NA
Mdn raw score	42.0	8.0	10.2	13.0
SD	13.7	2.7	10.4	14.3
Minimum	4.0	0.0	0.0	1.0
Maximum	95.0	20.0	54.4	75.0

*Based on individual student scores

The performance of Hawaiian/part-Hawaiian children, upon entry to kindergarten, is extremely low on the test of receptive (listening) vocabulary (PPVT-R) in relation to national norms. The test publishers characterize this test as "an

achievement test. . .that shows the extent of English vocabulary acquisition" (Dunn & Dunn, 1981, p. 2). It should be noted that the performance of all children in the State of Hawaii, regardless of ethnicity, is quite low (19th percentile) on the national norms. Ethnic Hawaiian children, at the 13th percentile, are thus starting their schooling well below both State and national typical language performance levels.

The Developmental Test of Visual-Motor Integration (VMI) is claimed by its author to be a measure of sensorimotor or neuropsychological functioning. The results on this test reveal a very different pattern of performance than that observed with the PPVT-R. Hawaiian/part-Hawaiian children score, on the average, near the mid-point of the national norms (45th percentile). For all kindergarten children in the State, the percentile equivalent to the average score is 56.

Both the N_{Hwn} and SES variables form the skewed distributions that are to be expected. That is, we find a few schools with relatively large numbers of Hawaiian students and a few schools with large proportions of the families of students receiving AFDC or General Assistance. This skewness (see Figure 1) results in long tails at the high end of the distributions of the three need indexes, thereby permitting more reliable discrimination among those attendance areas with the highest priority for parent-child services.

The Pearson product-moment correlation coeffecients among the need-identification variables are given in Table 2. These intercorrelations indicate a strong common variance among the need-identification variables. The strength of correlations between the SES index and the other variables seems particularly notable.

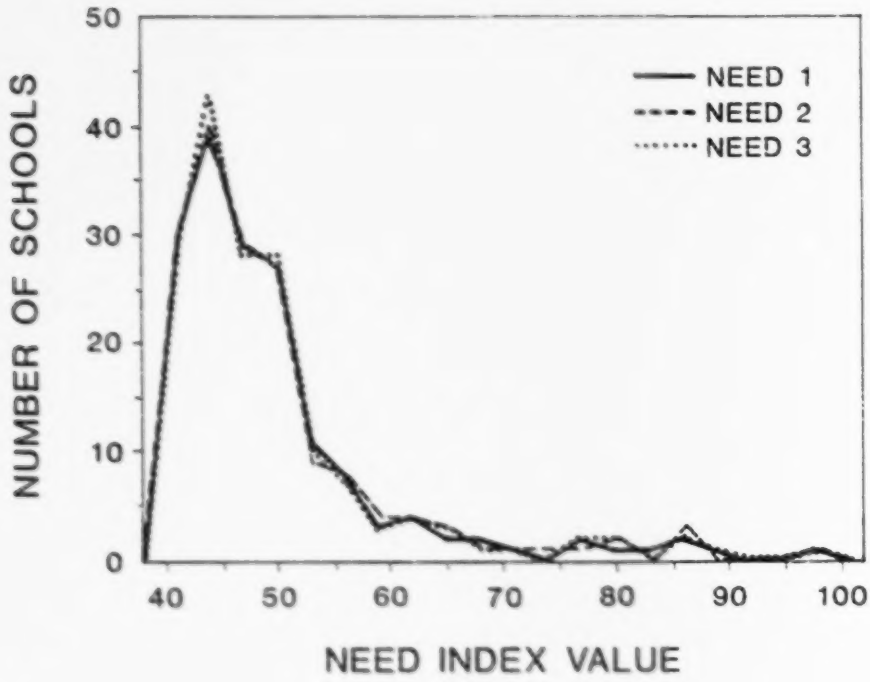

FIGURE 1. Distributions of Three Need Indexes.

Table 2

Intercorrelations of Need-Identification Variables (N=164 Schools)

	$\overline{\text{PPVT-R}}_{\text{Hwn}}$	$\overline{\text{VMI}}_{\text{Hwn}}$	SES	N_{Hwn}
$\overline{\text{PPVT-R}}_{\text{Hwn}}$	--			
$\overline{\text{VMI}}_{\text{Hwn}}$	.54	--		
SES	-.40	-.36	--	
N_{Hwn}	-.24	-.26	.46	--

The 15 highest-priority school-attendance areas identified by the three need-index formulas are given in Table 3. The need-index values for each of these schools, the number of Hawaiian kindergarteners enrolled, and the cumulative percent of Hawaiians included in the need-based rank-orderings of schools are reported. This information for all 164 schools is reported in the Appendix. Nearly 30% of all Hawaiian kindergarten children are enrolled in the 15 schools identified as having the greatest need for educationally-oriented, parent-child services. These rankings are displayed in graphic form in Figure 2. The intercorrelations of the need-identification variables are so strong that the effects of the weighting schemes are inconsequential. Agreement among the rankings as indicated by Kendall's coeffecient of concordance (W) (Siegel, 1956) is .99. The near-congruence of the distributions of these need indexes is apparent in Figure 2. The geographic location of the 15 highest-priority sites is displayed on the map presented as Figure 3.

Table 3

Fifteen Priority Sites Identified
by Three Needs Indexes

Need 1				Need 2				Need 3			
School	Need Value	N_{Hwn}	Cumul. % of Hwns	School	Need Value	N_{Hwn}	Cumul. % of Hwns	School	Need Value	N_{Hwn}	Cumul. % of Hwns
1 MA'ILI	97.80	75	2.8	1 MA'ILI	99.12	75	2.8	1 MA'ILI	98.67	75	2.8
2 WAI'ANAE	88.42	62	5.0	2 WAI'ANAE	87.70	62	5.0	2 WAI'ANAE	88.34	62	5.0
3 NANAIKAPONO	85.87	61	7.3	3 POPE	87.25	65	7.4	3 NANAIKAPONO	86.43	61	7.3
4 POPE	85.33	65	9.6	4 NANAIKAPONO	87.19	61	9.6	4 POPE	86.17	65	9.6
5 LEIHOKU	83.35	56	11.7	5 MAKAHA	80.60	53	11.6	5 LEIHOKU	81.41	56	11.7
6 MAKAHA	80.96	53	13.6	6 LEIHOKU	79.77	56	13.6	6 MAKAHA	80.99	53	13.6
7 PAHOA	76.52	56	15.7	7 PAHOA	76.29	56	15.7	7 PAHOA	76.62	56	15.7
8 NANAKULI	76.49	58	17.8	8 NANAKULI	75.50	58	17.8	8 NANAKULI	76.13	58	17.8
9 WAIPAHU	71.49	41	19.3	9 WAIPAHU	72.29	41	19.3	9 WAIPAHU	71.74	41	19.3
10 HAU'ULA	67.96	42	20.9	10 HAU'ULA	67.56	42	20.9	10 HAU'ULA	67.93	42	20.9
11 WAILUKU	67.09	46	22.6	11 WAILUKU	65.71	46	22.6	11 WAILUKU	65.86	46	22.6
12 HILO UNION	64.34	38	24.0	12 HILO UNION	65.24	38	24.0	12 HILO UNION	65.19	38	24.0
13 KEAUKAHA	64.26	35	25.2	13 KEAUKAHA	64.88	35	25.2	13 KEAUKAHA	64.22	35	25.2
14 KAPA'A	63.87	43	26.8	14 WAIAKEA	63.66	41	26.7	14 WAIAKEA	63.78	41	26.7
15 WAIAKEA	63.70	41	28.3	15 KAPA'A	63.16	43	28.3	15 KAPA'A	63.46	43	28.3

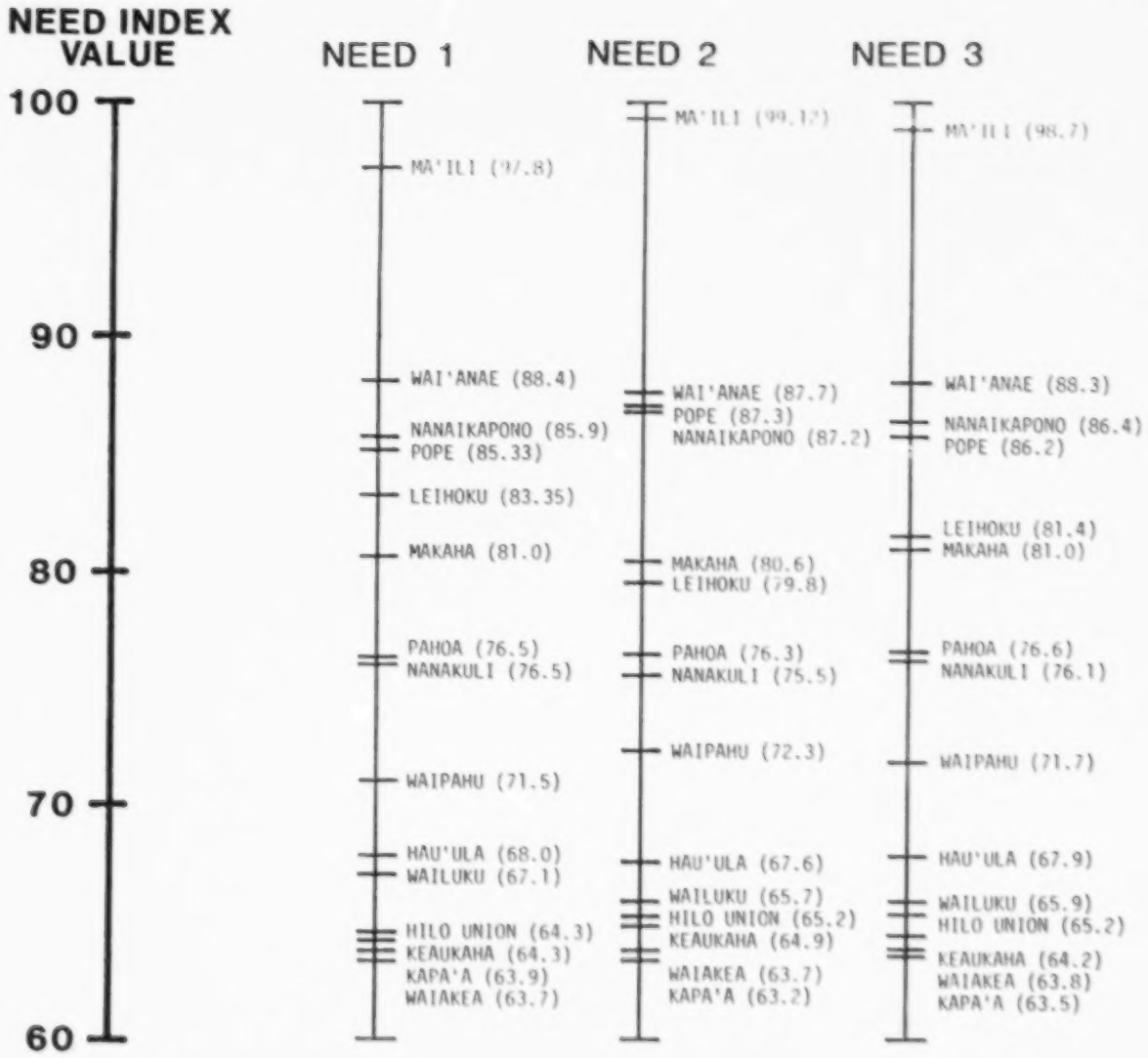

FIGURE 2. Need Index Values of 15 Highest-Priority School-Attendance Areas.

FIGURE 3. Geographic Location of 15 Highest-Priority School-Attendance Areas.

Discussion

The methodology developed in this study provides an empirical procedure for identifying those geographic locations that have the largest concentration of Hawaiian families with the most intense education-related needs. These results alone do not, however, constitute sufficient information for the selection of sites for such services. Several other considerations are important. A location, identified here as having priority status, may already be served by programs similar to those being planned. It may be desirable to locate initial program efforts in those communities where good relations have been established with existing KS/BE programs. Population trends may indicate that some locations are increasing in the number of Hawaiian families while others are decreasing in Hawaiian population. Further, it must be remembered that the analyses reported here employed a limited number of variables that were used because they corresponded to readily-available data. Familiarity with potential site-neighborhoods on the part of community residents, other service providers, and leaders of advocacy groups will surely improve the validity of final site-selection. As the planned needs assessment proceeds through subsequent stages, these issues will be addressed.

The methodology developed for this part of the needs assessment may have other useful applications. It is possible, using this procedure, to study concentrations of a variety of educational risk factors such as child neglect and abuse, prenatal health, nutrition, and employment status in the population of Hawaiian families. Knowing where, and how, such risk factors combine to affect the educational success of Hawaiian children should be of considerable value in planning a program of parent-child services. It is possible to develop need-specific maps of the families of Hawaiian children. We can identify concentrations of the Hawaiian population that are without services corresponding to specific needs.

The need indexes computed for each of the school attendance areas are likely to be useful when it is necessary to identify schools that are similar, or dissimilar, for matching, grouping, or covariance analyses. For example, we might look at the relative effectiveness of differing educational or social programs that serve attendance areas with comparable need indexes. These need indexes and their component terms can also be used as stratification variables in selecting representative samples of pupils, schools, and families.

One of the most useful findings of this study is that the statewide need of Hawaiian families for educationally-oriented services (as "need" is defined here) is highly concentrated. Thirty percent of the State's under-five-year-old Hawaiian population is to be found in the 15 highest-priority school attendance areas identified here. Six of these 15 attendance areas are on the Leeward coast of O'ahu. Such a concentration of need is an advantage to the program planner. Often, when available resources must be dispersed over a large population and a wide geographic area, it becomes impossible to achieve the critical mass of service required to achieve program effect. In this instance, the demographic and geographic boundaries are tightly drawn. It is, therefore, possible to focus the total resources of a program (or a coordinated group of programs) with the reasonable hope of achieving significant and enduring effects.

Appendix

Rank Order of School Attendance Areas
Identified by Three Needs Indexes

Need 1				Need 2				Need 3			
	School	Need Value	N_{Hwn}	Cumul. % of Hwns	School	Need Value	N_{Hwn}	Cumul. % of Hwns	School	Need Value	N_{Hwn}	Cumul. % of Hwns
1	MA'ILI	97.83	75	2.8	MA'ILI	99.12	75	2.8	MA'ILI	98.67	75	2.8
2	WAI'ANAE	88.42	62	5.0	WAI'ANAE	87.70	62	5.0	WAI'ANAE	88.34	62	5.0
3	NANAIKAPONO	85.87	61	7.3	POPE	87.25	65	7.4	NANAIKAPONO	86.43	61	7.3
4	POPE	85.33	65	9.6	NANAIKAPONO	87.19	61	9.6	POPE	86.17	65	9.6
5	LEIHOKU	83.35	56	11.7	MAKAHA	80.60	53	11.6	LEIHOKU	81.41	56	11.7
6	MAKAHA	80.96	53	13.6	LEIHOKU	79.77	56	13.6	MAKAHA	80.99	53	13.6
7	PAHOA	78.52	56	15.7	PAHOA	76.28	56	15.7	PAHOA	76.61	56	15.7
8	NANAKULI	76.49	58	17.8	NANAKULI	75.50	58	17.8	NANAKULI	76.13	58	17.8
9	WAIPAHU	71.49	41	19.3	WAIPAHU	72.29	41	19.3	WAIPAHU	71.74	41	19.3
10	HAU'ULA	67.96	42	20.9	HAU'ULA	67.56	42	20.9	HAU'ULA	67.93	42	20.9
11	WAILUKU	67.09	46	22.6	WAILUKU	65.71	46	22.6	WAILUKU	65.86	46	22.6
12	HILO UNION	64.34	38	24.0	HILO UNION	65.24	38	24.0	HILO UNION	65.19	38	24.0
13	KEAUKAHA	64.26	35	25.2	KEAUKAHA	64.88	35	25.2	KEAUKAHA	64.22	35	25.2
14	KAPA'A	63.87	43	26.8	WAIAKEA	63.66	41	26.7	WAIAKEA	63.78	41	26.7
15	WAIAKEA	63.70	41	28.3	KAPA'A	63.16	43	28.3	KAPA'A	63.46	43	28.3
16	WAIAMEA	62.87	45	30.0	WAIAMEA	62.88	45	30.0	WAIAMEA	62.79	45	30.0
17	KUALAPU'U	61.40	28	31.0	KUALAPU'U	62.06	28	31.0	KUALAPU'U	62.40	28	31.0
18	HEEIA	59.89	39	32.4	WAIMANALO	59.71	32	32.2	WAIMANALO	59.71	32	32.2
19	LINCOLN	59.70	34	33.7	HEEIA	59.41	39	33.6	HEEIA	59.67	39	33.6
20	WAIMANALO	59.70	32	34.8	LINCOLN	59.32	34	34.8	LINCOLN	59.39	34	34.8
21	PARKER	57.82	30	36.0	HALEIWA	58.14	29	35.9	HALEIWA	57.71	29	35.9
22	HALEIWA	57.47	29	37.0	PARKER	57.36	30	37.0	PARKER	57.60	30	37.0
23	KEALAKEHE	57.07	34	38.3	KAUNAKAKAI	57.34	26	38.0	WAIAKEA-WAENA	57.19	35	38.3
24	WAIAKEA-WAENA	57.00	35	39.5	WAIAKEA-WAENA	57.24	35	39.3	KAUNAKAKAI	56.98	26	39.3
25	KAUNAKAKAI	56.48	26	40.5	KEALAKEHE	56.10	34	40.5	KEALAKEHE	56.67	34	40.5
26	PAUOA	55.85	28	41.5	KALIHI-KAI	55.51	26	41.5	KAPI'OLANI	55.81	23	41.3
27	KAPI'OLANI	55.80	23	42.4	PAUOA	55.38	28	42.5	PAUOA	55.39	28	42.4

Appendix (Cont.)

Need 1				Need 2				Need 3			
School	Need Value	N_{Hwn}	Cumul. % of Hwns	School	Need Value	N_{Hwn}	Cumul. % of Hwns	School	Need Value	N_{Hwn}	Cumul. % of Hwns
28 KALANIANA'OLE	55.26	23	43.2	28 KAPI'OLANI	55.33	23	43.3	28 KALANIANA'OLE	54.89	23	43.2
29 KAHAKAI	54.99	27	44.2	29 KALANIANA'OLE	55.20	23	44.2	29 KALIHI-KAI	54.81	26	44.2
30 KANE'OHE	54.61	29	45.3	30 KANE'OHE	54.98	29	45.2	30 KAHAKAI	54.77	27	45.2
31 KALIHI-KAI	54.56	26	46.2	31 KAHAKAI	54.75	27	46.2	31 KANE'OHE	54.75	29	46.2
32 HONOWAI	54.36	21	47.0	32 LA'IE	54.64	29	47.3	32 LA'IE	54.37	29	47.3
33 LA'IE	54.28	29	48.1	33 LINAPUNI	54.51	16	47.9	33 HONOWAI	54.31	21	48.1
34 KOHALA	53.47	26	49.0	34 HONOWAI	54.26	21	48.6	34 LINAPUNI	54.29	16	48.6
35 LINAPUNI	53.43	16	49.6	35 KOHALA	52.90	26	49.6	35 KOHALA	53.19	26	49.6
36 WAIHE'E	53.12	22	50.4	36 WAIHE'E	52.78	22	50.4	36 WAIHE'E	52.74	22	50.4
37 KAPALAMA	52.16	23	51.2	37 LIHIKAI	52.37	22	51.2	37 KAULUWELA	52.04	22	51.2
38 KAULUWELA	52.02	22	52.1	38 KAULUWELA	52.29	22	52.0	38 KONA-WAENA	51.99	24	52.1
39 KONA-WAENA	52.02	24	52.9	39 KONA-WAENA	51.90	24	52.9	39 KAPALAMA	51.88	23	52.9
40 KAPUNAHALU	51.96	19	53.6	40 WILCOX	51.88	24	53.8	40 KAPUNAHALU	51.80	19	53.6
41 KAILUA	51.89	19	54.3	41 KAPUNAHALU	51.86	19	54.5	41 LIHIKAI	51.79	22	54.4
42 LIHIKAI	51.78	22	55.1	42 KAPALAMA	51.68	23	55.3	42 KAILUA	51.60	19	55.1
43 PUKALANI	51.77	24	56.0	43 WAHIAWA	51.47	19	56.0	43 PUKALANI	51.50	24	56.0
44 WILCOX	51.44	24	56.9	44 PU'UHALE	51.41	19	56.7	44 WILCOX	51.42	24	56.9
45 PU'UHALE	51.39	19	57.6	45 PUKALANI	51.34	24	57.6	45 PU'UHALE	51.38	19	57.6
46 KOLOA	51.04	22	58.4	46 KAILUA	51.28	19	58.3	46 FERN	51.18	18	58.3
47 FERN	50.94	18	59.1	47 FERN	51.22	18	58.9	47 WAHIAWA	51.16	18	58.9
48 'EWA BEACH	50.91	16	59.6	48 HONAUNAU	50.89	19	59.6	48 KOLOA	50.78	22	59.7
49 KAHUKU	50.87	19	60.3	49 KAHUKU	50.84	19	60.3	49 KAHUKU	50.75	19	60.4
50 WAHIAWA	50.83	18	61.0	50 KA'AHUMANU	50.64	20	61.0	50 KA'AHUMANU	50.62	20	61.2
51 'AHUIMANU	50.60	22	61.8	51 KOLOA	50.46	22	61.8	51 HONAUNAU	50.39	19	61.8
52 KA'AHUMANU	50.41	20	62.5	52 KAHALUU	50.28	16	62.4	52 'EWA BEACH	50.38	16	62.4
53 KAIMALU	50.41	19	63.2	53 KA'U	50.21	20	63.2	53 'AHUIMANU	50.31	22	63.2
54 LANAKILA	50.05	15	63.8	54 MAKAWAO	50.15	19	63.9	54 KAIMALU	50.11	19	63.9
55 HONAUNAU	49.91	19	64.5	55 'EWA BEACH	50.05	16	64.5	55 KAHALUU	50.07	16	64.5
56 MAKAWAO	49.86	19	65.2	56 'AHUIMANU	50.00	22	65.3	56 MAKAWAO	49.90	19	65.2
57 SCOTT	49.82	21	66.0	57 ILIAHI	49.81	17	65.9	57 KAALA	49.86	16	65.8
58 KAHALUU	49.80	16	66.5	58 SCOTT	49.74	21	66.7	58 SCOTT	49.81	21	66.6

Appendix (Cont.)

Need 1				Need 2				Need 3			
School	Need Value	N_{Hwn}	Cumul. % of Hwns	School	Need Value	N_{Hwn}	Cumul. % of Hwns	School	Need Value	N_{Hwn}	Cumul. % of Hwns
59 MOUNTAIN VIEW	49.78	12	67.0	59 KAALA	49.72	16	67.2	59 LANAKILA	49.74	15	67.1
60 KAALA	49.73	16	67.6	60 KAINALU	49.69	19	67.9	60 ILIAHI	49.71	17	67.8
61 KA'U	49.62	20	68.3	61 LANAKILA	49.65	15	68.5	61 KA'U	49.70	20	68.5
62 ILIAHI	49.60	17	68.9	62 KEKAHA	49.54	17	69.1	62 KIHEI	49.34	19	69.2
63 WAIMEA CANYON	49.37	16	69.5	63 WAIMEA CANYON	49.51	16	69.7	63 KEKAHA	49.26	17	69.8
64 KEKAHA	49.36	17	70.1	64 KIHEI	49.28	19	70.4	64 WAIMEA CANYON	49.18	16	70.4
65 KIHEI	49.23	19	70.8	65 ALA WAI	49.08	14	70.9	65 MOUNTAIN VIEW	49.14	12	70.8
66 WA'ALEHU	49.06	13	71.3	66 KAMEHAMEHA III	48.75	19	71.6	66 ALA WAI	48.89	14	71.3
67 ALA WAI	48.81	14	71.8	67 SALT LAKE	48.70	15	72.2	67 WA'ALEHU	48.70	13	71.8
68 POHAKEA	48.75	13	72.3	68 WA'ALEHU	48.68	13	72.6	68 KALIHI	48.65	11	72.2
69 KALIHI	48.66	11	72.7	69 WAIMALU	48.65	16	73.2	69 KAMEHAMEHA III	48.50	19	72.9
70 WAIMALU	48.41	16	73.3	70 KALIHI	48.60	11	73.6	70 POHAKEA	48.47	13	73.4
71 KAMEHAMEHA III	48.39	19	74.0	71 WAIAHOLE	48.60	12	74.1	71 WAIAHOLE	48.45	12	73.8
72 WAIAHOLE	48.25	12	74.4	72 MOUNTAIN VIEW	48.54	12	74.5	72 WAIMALU	48.40	16	74.4
73 PALISADES	48.24	15	75.0	73 PALISADES	48.33	15	75.1	73 SALT LAKE	48.28	15	75.0
74 SALT LAKE	48.14	15	75.5	74 KAUMANA	48.27	13	75.5	74 PALISADES	48.16	15	75.5
75 KEA'AU	47.88	13	76.0	75 POHAKEA	48.13	13	76.0	75 KAUMANA	48.05	13	76.0
76 KAHULUI	47.86	18	76.7	76 KAHULUI	47.84	18	76.7	76 KEA'AU	47.97	13	76.5
77 KAUMANA	47.83	13	77.1	77 RED HILL	47.81	17	77.3	77 KAHULUI	47.91	18	77.1
78 HANA	47.77	15	77.7	78 KEA'AU	47.77	13	77.8	78 AIEA	47.76	12	77.6
79 HA'IKU	47.70	13	78.2	79 AIEA	47.61	12	78.2	79 HANA	47.63	15	78.1
80 AIEA	47.66	12	78.6	80 HA'IKU	47.58	13	78.7	80 RED HILL	47.61	17	78.8
81 RED HILL	47.65	17	79.2	81 ROYAL	47.50	14	79.2	81 HA'IKU	47.60	13	79.2
82 HELEMANO	47.36	12	79.7	82 HANA	47.47	15	79.8	82 ROYAL	47.28	14	79.8
83 AHRENS	47.13	12	80.1	83 AHRENS	47.14	12	80.2	83 AHRENS	47.02	12	80.2
84 ROYAL	47.05	14	80.6	84 SUNSET BEACH	47.01	10	80.6	84 MAUNALOA	47.02	10	80.6
85 HONOKA'A	47.00	12	81.1	85 MAUNALOA	46.98	10	80.9	85 HELEMANO	46.99	12	81.0
86 MAKAKILO	46.82	12	81.5	86 HONOKA'A	46.86	12	81.4	86 HONOKA'A	46.83	12	81.4
87 MAUNALOA	46.81	10	81.9	87 HELEMANO	46.83	12	81.8	87 KEOLU	46.78	14	82.0
88 ENCHANTED LAKE	46.73	13	82.4	88 KEOLU	46.80	14	82.3	88 SUNSET BEACH	46.77	10	82.3
89 KEOLU	46.69	14	82.9	89 PEARL HARBOR	46.71	13	82.8	89 MAKAKILO	46.66	12	82.8

Appendix (Cont.)

	Need 1			Need 2			Need 3		
	School	Need Value	N_{Hwn}	Cumul. % of Hwns	School	Need Value	N_{Hwn}	Cumul. % of Hwns	School	Need Value	N_{Hwn}	Cumul. % of Hwns
90	PEARL HARBOR	46.66	13	83.3	90 MAKAKILO	46.64	12	83.2	90 PEARL HARBOR	46.59	13	83.2
91	SUNSET BEACH	46.41	10	83.7	91 LIKELIKE	46.59	9	83.6	91 KILOHANA	46.49	8	83.5
92	LIKELIKE	46.19	9	84.0	92 KILOHANA	46.38	8	83.9	92 ENCHANTED LAKE	46.40	13	84.0
93	KANOELANI	46.10	13	84.5	93 ENCHANTED LAKE	46.03	13	84.3	93 LIKELIKE	46.27	9	84.3
94	DE SILVA	46.06	11	84.9	94 KIPAPA	46.02	12	84.8	94 DE SILVA	45.91	11	84.7
95	KILOHANA	46.03	8	85.2	95 KAIMILOA	45.95	9	85.1	95 KANOELANI	45.90	13	85.2
96	MA'EMA'E	45.95	13	85.7	96 KANOELANI	45.82	13	85.6	96 MA'EMA'E	45.90	13	85.7
97	KAIMILOA	45.86	9	86.0	97 MA'EMA'E	45.78	13	86.1	97 KIPAPA	45.83	12	86.1
98	KIPAPA	45.73	12	86.5	98 DE SILVA	45.72	11	86.5	98 KAIMILOA	45.81	9	86.5
99	WAILUA	45.59	9	86.8	99 LUNALILO	45.66	10	86.8	99 LUNALILO	45.55	10	86.8
100	LUNALILO	45.53	10	87.2	100 WAILUA	45.52	9	87.2	100 WAILUA	45.54	9	87.2
101	HOLUALOA	45.48	8	87.5	101 HOLUALOA	45.43	8	87.5	101 HOLUALOA	45.44	8	87.5
102	MILILANI-UKA	45.28	13	87.9	102 MILILANI-UKA	45.42	13	87.9	102 MILILANI-UKA	45.36	13	87.9
103	PEARL CITY	44.92	9	88.3	103 PEARL CITY	45.30	9	88.3	103 PEARL CITY	45.03	9	88.3
104	'ELE'ELE	44.71	8	88.6	104 JEFFERSON	45.26	8	88.6	104 JEFFERSON	44.92	8	88.6
105	HO'OKENA	44.61	7	88.8	105 WEBLING	44.76	8	88.8	105 HO'OKENA	44.72	7	88.8
106	JEFFERSON	44.60	8	89.1	106 HO'OKENA	44.65	7	89.1	106 'ELE'ELE	44.65	8	89.1
107	KILAUEA	44.51	8	89.4	107 'ELE'ELE	44.64	8	89.4	107 KILAUEA	44.52	9	89.4
108	ALIAMANU	44.49	8	89.7	108 KA'A'AWA	44.54	7	89.7	108 WEBLING	44.49	9	89.7
109	WEBLING	44.49	8	90.0	109 ALIAMANU	44.41	8	89.9	109 KA'A'AWA	44.49	7	89.9
110	ANUENUE	44.45	5	90.2	110 KALIHI-UKA	44.41	7	90.2	110 ANUENUE	44.40	5	90.1
111	KA'A'AWA	44.32	7	90.4	111 KILAUEA	44.39	8	90.5	111 ALIAMANU	44.35	8	90.4
112	PU'OHALA	44.27	8	90.7	112 PU'OHALA	44.39	8	90.8	112 PU'OHALA	44.34	8	90.7
113	KA'EVAI	44.23	4	90.9	113 MOANALUA	44.22	9	91.1	113 KUHIO	44.25	6	91.0
114	KUHIO	44.22	8	91.2	114 ANUENUE	44.12	5	91.3	114 MOANALUA	44.18	9	91.3
115	HANALEI	44.21	7	91.4	115 KALAHEO	44.05	8	91.6	115 KALIHI-UKA	44.14	7	91.6
116	MOANALUA	44.18	9	91.7	116 KUHIO	44.01	8	91.9	116 HANALEI	44.09	7	91.9
117	'AIKAHI	44.03	9	92.1	117 HA'AHEO	43.98	7	92.1	117 'AIKAHI	44.04	9	92.2
118	KALIHI-UKA	44.02	7	92.3	118 KALIHI-WAENA	43.97	6	92.4	118 NU'UANU	43.99	9	92.5
119	AINA HAINA	44.01	8	92.6	119 NU'UANU	43.93	9	92.7	119 AINA HAINA	43.98	8	92.8
120	NU'UANU	43.97	9	93.0	120 AINA HAINA	43.89	8	93.0	120 KALAHEO	43.98	8	93.1

Appendix (Cont.)

Need 1				Need 2				Need 3			
	School	Need Value	N_{Hwn}	Cumul. % of Hwns	School	Need Value	N_{Hwn}	Cumul. % of Hwns	School	Need Value	N_{Hwn}	Cumul. % of Hwns
121	MAUKALANI	43.94	8	93.3	HANALEI	43.89	7	93.3	KALIHI-WAENA	43.98	6	93.3
122	KALAHEO	43.93	8	93.5	'AIKAHI	43.87	9	93.6	HA'AHEO	43.96	7	93.6
123	MAUNAWILA	43.90	8	93.8	MAUNAWILA	43.79	8	93.9	KA'EWAI	43.92	4	93.7
124	KALIHI-WAENA	43.89	6	94.1	MAUKALANI	43.76	8	94.2	MAUNAWILA	43.89	8	94.0
125	LIHOLIHO	43.87	7	94.3	LIHOLIHO	43.75	7	94.4	MAUKALANI	43.87	8	94.3
126	HA'AHEO	43.85	7	94.6	LAUPAHOEHOE	43.69	6	94.6	LIHOLIHO	43.84	7	94.6
127	PEARL CITY HIGHLANDS	43.71	6	94.8	KA'EWAI	43.64	4	94.8	PEARL CITY HIGHLANDS	43.58	6	94.8
128	ALI'IOLANI	43.46	6	95.0	LEHUA	43.63	6	95.0	ALI'IOLANI	43.54	6	95.0
129	LAUPAHOEHOE	43.42	6	95.2	ALI'IOLANI	43.62	6	95.2	LAUPAHOEHOE	43.53	6	95.2
130	WHEELER	43.41	7	95.5	PEARL CITY HIGHLANDS	43.34	6	95.5	MAKALAPA	43.42	5	95.4
131	MAKALAPA	43.20	5	95.7	MAKALAPA	43.33	5	95.6	WHEELER	43.38	7	95.7
132	LEHUA	43.18	6	95.9	WHEELER	43.33	7	95.9	LEHUA	43.31	6	95.9
133	WAI'ALAE	43.15	6	96.1	WAI'ALAE	43.20	6	96.1	WAI'ALAE	43.19	6	96.1
134	MANOA	43.00	7	96.4	LILI'UOKALANI	43.07	6	96.3	LILI'UOKALANI	43.05	6	96.3
135	MILILANI-WAENA	42.97	7	96.6	MILILANI-WAENA	42.94	7	96.6	MANOA	43.04	7	96.6
136	LILI'UOKALANI	42.96	6	96.8	MANOA	42.91	7	96.8	MILILANI-WAENA	43.03	7	96.8
137	PEARL RIDGE	42.78	5	97.0	PEARL RIDGE	42.86	5	97.0	PEARL RIDGE	42.79	5	97.0
138	KAUMAKANI	42.71	6	97.2	KAUMAKANI	42.63	6	97.2	KAUMAKANI	42.71	6	97.2
139	KOKO HEAD	42.65	6	97.5	KOKO HEAD	42.59	6	97.5	KOKO HEAD	42.69	6	97.5
140	PA'AUILO	42.47	4	97.6	PA'AUILO	42.58	4	97.6	PA'AUILO	42.53	4	97.6
141	KAMILOIKI	42.40	5	97.8	KAMILOIKI	42.47	5	97.8	KAMILOIKI	42.47	5	97.8
142	WILSON	42.24	5	98.0	WILSON	42.41	5	98.0	WILSON	42.37	5	98.0
143	KULA	42.06	4	98.1	SOLOMON	42.11	3	98.1	KULA	42.13	4	98.1
144	MANANA	42.04	4	98.3	LANIKAI	42.07	4	98.2	LANIKAI	42.13	4	98.3
145	KA'ELEPULU	42.03	3	98.4	KULA	42.05	4	98.4	MANANA	42.07	4	98.4
146	LANIKAI	42.03	4	98.5	MANANA	42.03	4	98.5	SOLOMON	42.00	3	98.5
147	SOLOMON	42.01	3	98.6	PA'IA	41.99	3	98.6	PA'IA	41.97	3	98.6
148	PA'IA	41.89	3	98.8	IROQUOIS POINT	41.97	3	98.8	KA'ELEPULU	41.95	3	98.8
149	IROQUOIS POINT	41.84	3	98.9	'EWA	41.84	3	98.9	KAHALA	41.88	4	98.9
150	KAHALA	41.81	4	99.0	KAHALA	41.80	4	99.0	IROQUOIS POINT	41.87	3	99.0
151	'EWA	41.76	3	99.1	KA'ELEPULU	41.75	3	99.1	'EWA	41.82	3	99.1

Appendix (Cont.)

Need 1				Need 2				Need 3			
School	Need Value	N_{Hwn}	Cumul. % of Hwns	School	Need Value	N_{Hwn}	Cumul. % of Hwns	School	Need Value	N_{Hwn}	Cumul. % of Hwns
152 LANAI	41.71	3	99.2	152 LANAI	41.69	3	99.2	152 LANAI	41.74	3	99.2
153 NOELANI	41.53	3	99.3	153 HAHA'IONE	41.51	3	99.3	153 HAHA'IONE	41.56	3	99.3
154 HAHA'IONE	41.51	3	99.4	154 NOELANI	41.47	3	99.4	154 NOELANI	41.56	3	99.4
155 MOKAPU	41.26	1	99.5	155 MOKAPU	41.25	1	99.5	155 MOKAPU	41.26	1	99.5
156 NIMITZ	41.15	2	99.6	156 NIMITZ	41.11	2	99.6	156 NIMITZ	41.18	2	99.6
157 PEARL HARBOR KAI	41.15	2	99.6	157 HALE KULA	41.10	2	99.6	157 PEARL HARBOR KAI	41.17	2	99.6
158 MOMILANI	41.10	2	99.7	158 PEARL HARBOR KAI	41.08	2	99.7	158 MOMILANI	41.15	2	99.7
159 HOKULANI	41.09	2	99.8	159 MOMILANI	41.06	2	99.8	159 HOKULANI	41.14	2	99.8
160 HALE KULA	41.06	2	99.9	160 HOKULANI	41.03	2	99.9	160 HALE KULA	41.13	2	99.9
161 WAIAU	40.76	1	99.9	161 HICKAM	40.78	1	99.9	161 WAIAU	40.82	1	99.9
162 HICKAM	40.75	1	99.9	162 WAIAU	40.77	1	99.9	162 HICKAM	40.81	1	99.9
163 MOKULELE	40.74	1	100.0	163 MOKULELE	40.70	1	100.0	163 MOKULELE	40.77	1	100.0
164 WAILUPE VALLEY	40.68	1	100.0	164 WAILUPE VALLEY	40.65	1	100.0	164 WAILUPE VALLEY	40.75	1	100.0

References

Beery, K. E. (1982). Revised administration, scoring, and teaching manual for the developmental test of visual-motor integration. Cleveland: Modern Curriculum Press.

Dunn, L. M., & Dunn, L. M. (1981). Peabody picture vocabulary test-revised manual. Circle Pines, MN: American Guidance Service.

Kamehameha Schools. (1982). Imua Kamehameha: Forward into the eighties. Honolulu, HI: Kamehameha Schools

Siegel, S. (1956). Nonparametric statistics for the behavioral sciences. New York: McGraw-Hill, Inc.